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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,006	03/24/2005	Yasuo Nishi	KOY-0046	8797

23413 7590 02/06/2007
CANTOR COLBURN, LLP
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EXAMINER

BOECKMANN, JASON J

ART UNIT	PAPER NUMBER
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3752

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/529,006

Applicant(s)

NISHI ET AL.

Examiner

Jason J. Boeckmann

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/22/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 4,5 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/24/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/22/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/22/2007 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Maria Rijn Van (WO 02/18058) using US 2003/018507 for reference.

Maria Rijn Van shows a liquid jetting device comprising a liquid jetting head (12) comprising a nozzle (13) to jet the droplet from an edge portion (10) an inside diameter of the edge portion being 2 micrometers, a liquid solution supplying section (18) to supply the liquid solution to the nozzle and a jetting voltage applying section (paragraph 78, lines 1-5) to apply a jetting voltage to the liquid solution in the nozzle, a convex meniscus forming section to form a state where the liquid solution in the nozzle

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protrudes from the edge portion. A meniscus is inherently formed in the nozzle portion of the present invention and in order to jet a liquid, the jetting voltage must be within the specified range.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 6 and 8, are rejected under 35 U.S.C. 102(a) as being unpatentable over Hotomi (5,477,249) in view of Maria Rijn Van (WO 02/18058) using US 2003/018507 for reference.

Hotomi shows a liquid jetting apparatus comprising; a liquid jetting head (4) comprising a nozzle (15) to jet a droplet from an edge portion, an inside diameter

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(figure 1) of the edge portion being 20 micrometers (column 3, line 61); a liquid solution supplying section (6) and a jetting voltage applying section (9, 17) to apply a voltage to the liquid solution and a convex meniscus forming section (10, 14) to form a state where the liquid solution in the nozzle protrudes from the nozzle edge portion (figure 1) wherein the jetting voltage is set to a value in the range that a droplet is capable of being jetted in a state where a convex meniscus is formed (shown in fig. 2), and a droplet is not jetted where a convex meniscus is not formed (no voltage). Hotomi does not specifically disclose that an inside diameter of the edge portion being less than 4 micrometers or greater than 0.2 micrometers. However, Maria Rijn Van shows a liquid jetting device comprising a liquid jetting head (12) comprising a nozzle (13) to jet the droplet from an edge portion (10) an inside diameter of the edge portion being 2 micrometers. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to reduce the size of the inside diameter of the edge portion of the nozzle of Hotomi, to about 2 micrometers, in order to atomize the fluid to be sprayed to produce small liquid droplets in air with a relative narrow droplet size, as taught by Maria Rijn Van (paragraph 0002).

Regarding claims 2 and 3, Hotomi shows an operation control section (13, 11, 18) to control the driving voltage of the convex meniscus forming section (10, 14) and the jetting voltage by the jetting voltage applying section (9, 17). The operation control section comprises; a first jetting control section (11) to control the driving voltage of the convex meniscus forming section (10, 14) and the liquid jetting section (9, 17); and a liquid stabilization control section to draw a liquid level at the nozzle edge (10, 14, 2).

Regarding claim 6, the convex meniscus forming section comprises a piezo element (14) that changes the capacity of the nozzle.

Regarding claim 8, the claimed equation is an obvious expression of a functioning electrostatic jetting nozzle.

Claims 1-3, 6 and 8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotomi (5,477,249) in view of Takahashi (6,412,925).

Hotomi shows a liquid jetting apparatus comprising; a liquid jetting head (4) comprising a nozzle (15) to jet a droplet from an edge portion, an inside diameter (figure 1) of the edge portion being 20 micrometers (column 3, line 61); a liquid solution supplying section (6) and a jetting voltage applying section (9, 17) to apply a voltage to the liquid solution and a convex meniscus forming section (10, 14) to form a state where the liquid solution in the nozzle protrudes from the nozzle edge portion (figure 1) wherein the jetting voltage is set to a value in the range that a droplet is capable of being jetted in a state where a convex meniscus is formed (shown in fig. 2), and a droplet is not jetted where a convex meniscus is not formed (no voltage). Hotomi does not specifically disclose that an inside diameter of the edge portion being less than 4 micrometers or greater than 0.2 micrometers. However, Takahashi teaches that, "Recently, demands for higher printing resolutions have increased in order to improve print quality. To respond to such demands, it is preferable to reduce the ink droplet volume. The ink droplet volume is usually reduced by reducing the nozzle diameter or

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by reducing the drive voltage" (column 2, lines 44-49), making the nozzle diameter and the drive voltage results effective variables. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to reduce the size of the inside diameter of the edge portion of the nozzle of Hotomi, to about 2 micrometers, since it has been held that discovering an optimum value of a results effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 CCPA 1980). This modification would increase the resolution of the fine spray that leaves the nozzle as taught by Takahashi.

Regarding claims 2 and 3, Hotomi shows an operation control section (13, 11, 18) to control the driving voltage of the convex meniscus forming section (10, 14) and the jetting voltage by the jetting voltage applying section (9, 17). The operation control section comprises; a first jetting control section (11) to control the driving voltage of the convex meniscus forming section (10, 14) and the liquid jetting section (9, 17); and a liquid stabilization control section to draw a liquid level at the nozzle edge (10, 14, 2).

Regarding claim 6, the convex meniscus forming section comprises a piezo element (14) that changes the capacity of the nozzle.

Regarding claim 8, the claimed equation is an obvious expression of a functioning electrostatic jetting nozzle.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotomi (5,477,249) in view of Maria Rijn Van (WO 02/18058) using US 2003/018507 for reference, further in view of Yamada et al (6,420,476).

Hotomi as modified by Maria Rijn Van shows all aspects of the applicant's invention in the rejection of claim 1 above, including that the nozzle is formed from a polyimide resin compound material, which inherently has an insulating property (column 6, line 41), but does not specifically disclose that the polyimide material has a dielectric breakdown strength of not less than 10 kV/mm. However, Yamada et al discloses a heat resistance, low dielectric-constant material resin composition that has a dielectric constant of at least 15kV/mm (column 12, line 33) that may contain a polyimide additive (column 2, line 49). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to make the nozzle, of Hotomi as modified by Maria Rijn Van, out of the heat resistive, low dielectric-constant material resin composition of Yamada et al, in order to make the nozzle resistant to high operating temperatures and electric current.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotomi (5,477,249) in view of Takahashi (6,412,925), further in view of Yamada et al (6,420,476).

Hotomi as modified by Takahashi shows all aspects of the applicant's invention in the rejection of claim 1 above, including that the nozzle is formed from a polyimide resin compound material, which inherently has an insulating property (column 6, line 41), but does not specifically disclose that the polyimide material has a dielectric breakdown strength of not less than 10 kV/mm. However, Yamada et al discloses a heat resistance, low dielectric-constant material resin composition that has a dielectric

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constant of at least 15kV/mm (column 12, line 33) that may contain a polyimide additive (column 2, line 49). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to make the nozzle, of Hotomi as modified by Takahashi, out of the heat resistive, low dielectric-constant material resin composition of Yamada et al, in order to make the nozzle resistant to high operating temperatures and electric current.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8, 12 and 13 of copending Application No. 10/529,004. Although the conflicting claims are not identical, they are

not patentably distinct from each other because claim 1 of application number 10/529,004 includes all limitations of claim 1 of the present invention word for word, except for a convex meniscus forming section to form a state where the liquid solution in the nozzle protrudes from the edge portion and that the jetting voltage is in the range that a droplet is jetted and that a droplet is not jetted. However, a meniscus is inherently formed in the nozzle portion of the present invention, and in order to jet a liquid, the jetting voltage must be within the specified range.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

Applicant's arguments filed on 1/22/2007 have been fully considered but they are not persuasive. Even though Hotomi does not specifically teach a nozzle diameter of between 0.2 and 4 microns, it does teach an inside nozzle diameter of less than 10 microns (because the outer diameter is 10 microns), Takahashi includes a specific teaching of decreasing the nozzle diameter to produce a certain effect. Therefore one of ordinary skill in the art would have been motivated to reduce the nozzle diameter of Hotomi in order to achieve the desired effect as taught by Takahashi.

Regarding the double patenting rejection, the rejection is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. See MPEP 804 (I)(B).

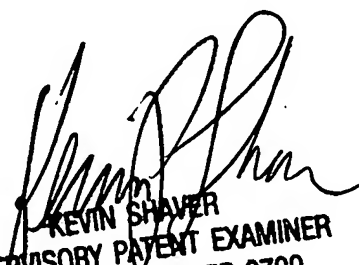
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason J. Boeckmann whose telephone number is (571) 272-2708. The examiner can normally be reached on 7:30 - 5:00 m-f, first Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin P. Shaver can be reached on (571) 272-4720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JJB JJB 2/1/07


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